Department of Computer Applications
National Institute of Technology Tiruchirappalli

1.Course Outline

Course Title	Mathematical Foundations of Computer Applications		
Course Code	CA713		
Department	CA	**No. of Credits**	3
Pre-requisites Course Code	NIL	**Faculty Name**	Dr. Arish. P
PAC Chairman	Dr. U. Srinivasulu Reddy		
E-mail	arish@nitt.edu	**Telephone No.**	+91-9677376606
Course Type	Core Course		

2. Course Overview

Mathematical Foundations of Computer Applications explains the fundamental concepts in mathematics. This course is useful for the students in computer science/applications as an introduction to the underlying ideas of mathematics for computer science. It explains topics like mathematical logic, predicates, relations, functions, combinatorics, algebraic structures and graph theory.

3. Course Objectives

- To learn the mathematical foundations applicable to computing.

4. Course Outcomes (CO)

Student will be able to:
- Explain functions and related concepts and illustrate its direct application in computer languages.
- Solve the problems using the concepts of Graphs and Trees.
- Deduce complex task by various mathematical logic.
- Solve recurrence relations for a given problem.

5. Course Outcome (CO)	Aligned Programme Outcome (PO)											
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
Explain functions and related concepts and illustrate its direct application in computer languages.	H	L	H	L								
Solve the problems using the concepts of Graphs and Trees.	L	M	H	M								
Deduce complex task by various mathematical logic.		H		M								
Solve recurrence relations for a given problem.	L	H		L								

L-Low   M-Medium   H-High

6. Course Teaching and Learning Activities

Week	No. of Classes	Topic Covered	Mode of Delivery
1	Class-I	Sets: Definition, types	Chalk and Talk , Power Point Presentation
	Class-II	Set operations	Chalk and Talk
	Class-III	Relations	Chalk and Talk
2	Class-I	Posets	Chalk and Talk , Power Point Presentation
	Class-II	Functions	Chalk and Talk , Power Point Presentation
	Class-III	Mathematical Inductions	Chalk and Talk
3	Class-I	Principles of Counting	Chalk and Talk
	Class-II	Graphs	Chalk and Talk , Power Point Presentation
	Class-III	Matrix representation of graphs	Chalk and Talk , Power Point Presentation
4	Class-I	Trees and Spanning Trees	Chalk and Talk , Power Point Presentation
	Class-II	Minimal Spanning Tree Algorithms	Chalk and Talk , Power Point Presentation
	Class-III	Minimal Spanning Tree Algorithms	Chalk and Talk , Power Point Presentation
5	Class-I	Euler graphs	Chalk and Talk , Power Point Presentation
	Class-II	Hamiltonian graphs	Chalk and Talk , Power Point Presentation
	Class-III	Graph theoretic algorithms	Chalk and Talk , Power Point Presentation

6	Class-I	Recurrence Relations	Chalk and Talk , Power Point Presentation
	Class-II	Genarating Functions	Chalk and Talk , Power Point Presentation
	Class-III	Homogeneous and non-homogeneous recurrences and their solutions	Chalk and Talk , Power Point Presentation
7	Class-I	Solving recurrences using generating functions	Chalk and Talk , Power Point Presentation
	Class-II	Mathematical Logic	Chalk and Talk
	Class-III	Predicate Calculus	Chalk and Talk
8	Class-I	Scope – Binding – Resolution	Chalk and Talk , Power Point Presentation
	Class-II	Regular Grammars	Chalk and Talk , Power Point Presentation
	Class-III	Recurrence Relations	Chalk and Talk , Power Point Presentation
9	Class-I	Finite Automata	Chalk and Talk , Power Point Presentation
	Class-II	Context-Free Grammars	Chalk and Talk , Power Point Presentation
	Class-III	Chomsky's Normal form	Chalk and Talk , Power Point Presentation
10	Class-I	Griebach Normal Form	Chalk and Talk , Power Point Presentation
	Class-II	Push-down Automata	Chalk and Talk , Power Point Presentation
	Class-III	Equivalence of CFL's and PDA's	Chalk and Talk , Power Point Presentation
11	Class-I	Non-context free languages	Chalk and Talk , Power Point Presentation
	Class-II	Revision of the syllabus	Chalk and Talk , Power Point Presentation

7. Course Assessment Methods – Theorey

Sl. No.	Mode of Assessment	Week/Date	Duration	Weightage(%)
1.	Cycle Test –1	4th week	60 mins	20
2.	Cycle Test –2	8th week	60 mins	20
3.	Assignment/Seminar	7th to 10th week	-	10
4.	End Semester Exam	-	180 mins	50
			Total	100

8. Essential Readings (Textbooks, Reference books, Websites, Journals, etc.)

REFERENCES:
1. Thomas Koshy, "Discrete Mathematics with Applications", Elsevier,2006.
2. NarsinghDeo, "Graph theory and applications to Engineering and Computer Science", PHI,1986.
3. Arthur Gill, "Applied Algebra for the Computer Sciences", Prentice Hall,1976.
4. Michael Sipser, "Introduction to Theory of Computation", PWS Publishing Co,1996.

9. Course Exit Survey (mention the ways by which the feedback about the course is assessed and indicate the attainment level)

1. The students through the class rep may give their feedback at any time to the course co-ordinator which will be duly addressed.
2. The students may also give their feedback during Class Committee meeting.
3. 'Course Outcome Survey' form will be distributed on the last working day to all the students and the feedback on various rubrics will be analyzed.
4. The COs will be computed after arriving at the final marks.

10. Course Policy (including plagiarism, academic honesty, attendance, etc.)

- **Plagiarism**
  The students are expected to come out with their original code for problems given assignments during the class work, and tests/examinations. If found to copy from internet/other students, zero marks will be assigned and action will be taken.

- **Attendance**
  100% is a must. However, relaxation will be given for leave on emergency requirements (medical, death, etc.) and representing institute events. Minimum 75% is required.

- **Academic Honesty**
  i. Possession of any electronic device, if any, found during the test or exam, the student will be debarred for 3 years from appearing for the exam and this will be printed in the Grade statement/Transcript.
  ii. Tampering of MIS records, if any, found, then the results of the student will be with held and the student will not be allowed to appear for the Placement interviews conducted by the Office of Training & Placement, besides (i).

11. Additional Course Information

- The students can get their doubts clarified at any time with their faculty member with prior appointment.

For Senate's Consideration

Dr. Arish. P
Course Faculty

Dr.U. Srinivasulu Reddy
Class Committee
Chairperson

Dr. S.R.Balasundaram
HOD/CA